Introduction

When I first started working in the technology industry, physical infrastructure used to be all that we worried about. Today we need to also address the social, political, ethical, and environmental impacts of technology on us as individuals and on us as a community.

—Marty Chakoian, Chief Technology Officer, City of Seattle

This Information Technology Indicators Report presents for the first time a set of measurements describing the state of information technology[1] as it impacts the social, economic and cultural health of Seattle. This ambitious project was initiated in 1999 by the City of Seattle Department of Information Technology and the City's Citizens Telecommunication and Technology Advisory Board (CTTAB) as a way to frame the deep reach of information technology and collect reliable information to guide future actions and investments. It was made possible by significant participation from a wide range of interested residents, technology, education, government, social service, business, activist and community leaders. It is our hope that these indicators and the process to create them will inform the development of national, international and other local technology impact indicators. Moreover we intend these as a tool to encourage communities and individuals to make informed and conscious choices about the role information technologies play in our lives.

These indicators differ from previous research by bringing together data about our relationship to information technology in a range of arenas. This report also provides valuable information about our own local community. It should enable readers to consider whether we utilize IT effectively, appropriately and in a manner which grows the capacity of our citizenry and institutions. The data collected for this project is already enabling more informed decision making; we hope that it continues to be actively used and will assist in efforts for positive and sustainable community development.

The measurements present a snapshot of the time they were gathered. The indicators project is to be longitudinal, with measurements retaken at later dates to track change. It is the City's intention to update these measurements every two to three years in order to effectively track the impact of information technology on the region over time. It is also a living, breathing work. The selection

and measurement of these indicators will mature as they are applied and modified by others. While seeking as much consistency as possible, they will also be revised in later generations to reflect changing technology and respond to community needs.

Technology Healthy Communities

Television, phones, and now computers and the Internet have changed the way we live, work, learn, participate and play. Previous research has also shown that digital opportunities are not equally available to all. Some residents and organizations do not have sufficient access, knowledge or the resources necessary to fully participate in the information age. The scope of the issue continues to evolve, but the gap between information rich and poor has generally been termed the "digital divide." Communities around the country and the world have developed initiatives with the goal of closing this gap.

Seattle has long had a commitment to closing the digital divide and ensuring that all citizens have access to Internet-based government services and the education sufficient to enable them to use these services. In the course of the indicators project, we have come to link our work on the digital divide with a more integrated and positive concept of developing a **technology healthy community**.

Early in the IT impact indicators project we chose five important themes to help guide our discussions. We found that these themes: **access, literacy, content, diversity, and infrastructure,** wove through all areas of the indicators. Certainly they overlap as well. They were used by community participants to help formulate the categories for our indicators.

The participants in the project helped articulate the following set of values to guide work on information technology development.

The City and people of Seattle want to build a technology healthy community where information technology:

- Enhances our local economy;
- Is applied to solving social issues;
- Is used to foster civic participation;
- Promotes relationship building and community development;
- Supports the sustainability of our quality of life; and
- Access to technology tools is equitable and affordable.

We believe the residents of Seattle can work together to guide the direction of information and community technologies towards these goals. To do so also requires public understanding of IT's capabili-

Like nature, communities are held together by a web of relationships, some of which extend beyond the community. The more communities understand these relationships, the better informed their choices will be.
—Communities by Choice, An Introduction to Sustainable Community Development[2]

ties, applications, and impacts.

Using the Indicators

The indicators are signposts to measure our progress in meeting these community goals. We hope that these indicators become a working tool for those who plan, fund and implement programs as well as those who develop products and services. It is our intent that they will inform, spark public dialogue, educate, encourage strategic planning and partnerships, focus programs and encourage effective resource allocation. If truly successful, the use of the data will further equitable and sustainable use of IT in the community, encourage IT to be used for civic good and better equip us to make personal choices about our use of information and communication technologies.

Some of the groups that we see using the indicators are:

- **Businesses,** as they seek to survive and thrive in the information economy, develop and deploy services and foster workforce development;
- **Organizations**, including neighborhood associations, non-profits and funders, as they connect to constituents and clients, plan and implement programs, and seek or provide technology resources to increase community and organizational capacity;
- **Schools and the Education Community,** as they work to ensure an education system that applies IT to learning goals, foster information technology fluency and create new opportunities for youth and lifelong learners;
- **Government,** as it develops e-services, encourages civic participation, fosters community development, and addresses social priorities; and
- **Residents**, trying to understand and manage the impact of IT on their personal lives, concerned with helping those in need, or seeking to take advantage of the new opportunities enabled by the use of information technology.

Breaking New Ground

This project poses a new model for evaluating the impact, both positive and negative, that information and communication technology is having on our region. Over time, we will be able to track changes and progress within the community using this baseline. In this report, we interpret and draw conclusions on some of the results of our research. For some data, the results will only be meaningful when compared over time. Some of the measures are new and may need to evolve to best capture our intent.

Our indicator formulation process drew much from the values and experiences of Sustainable Seattle as well as the King County Social and Health Indicators Project. The indicator categories and values they represent are based on public input. The linkage of categories is unique, but intentional. It recognizes that there is a wide set of interactions which foster or impede the development and sustainability of a technology healthy community. This approach also takes the analysis of the digital divide a step further towards encompassing gaps in the economic and social fabric of our community.

Devising this specific set of indicators was very challenging. We have assumed in the project that there are positive benefits of IT, but very consciously tried to forge a balance in the indicators construction, allowing for negative impacts and trends. Unfortunately many possible indicators also had to be left aside because they were too narrow, too costly or too difficult to measure. For instance one of these was measuring "technology greenspace," the amount of public space and bandwidth on the information highway reserved for non-commercial use. We recognize that there are other aspects of information technology to measure. This is a start to an evolving process.

Background and Process: Engaging the Public and Selecting Indicators

The idea for creating this set of indicators was presented to the City by members of the City of Seattle's Citizens Telecommunications and Technology Advisory Board (CTTAB). This was in response to our need to plan and evaluate the role of Seattle's Community Technology Programs.

To develop the indicators, we first turned to the community to construct a set of values and concerns for a technology healthy community. Extensive and diverse outreach resulted in more than 130 people attending a public forum to talk about the role that technology could and should play in a healthy community. The public concerns and values developed at the forum and subsequent online discourse became the backbone of the indicators presented here.[3]

A Technical Advisory Group[4] was formed, made up of community technology planners, evaluation experts, business leaders, economic development experts, technology developers and social service providers. They worked with us to take the public concerns and values from the forum and develop working indicators and identify potential data sources.

We then took a list of more than sixty indicators from the Technical Advisory Group and narrowed it down to a more manageable set. The indicators were evaluated according to a set of criteria that includes measurability, reliability, validity, and relevance to the identified public values. This set was returned to the Technical Advisory Group and to the public forum participants for review and comments.

The data collected for those indicators is presented here. As we collected data there was some revisions to the indicators, based on obtainable information.

Data Sources

Much of the data presented here comes from new original research conducted by the City. Other sources include educational institutions, state and federal governmental agencies, other City departments, and a range of other interest group and association reports. A list of reports that were consulted and other data sources are included at the end of this report.

In collecting this first set of data, the City created and conducted the following surveys:

- **The Information Technology Residential Survey**: A random-sample telephone survey was conducted of residents in 1,011 Seattle homes. Data was weighted for age, ethnicity, location, and gender based on 2000 Census data in order to reflect the demographics of the Seattle population as a whole.[5]
- **Technology Usage in Non-Profit Organizations**: A mail and e-mail survey was distributed to a list of approximately 700 non-profit organizations with offices in Seattle. The list of non-profits was developed in conjunction with United Way, King County Community Services Division, the City of Seattle Human Services Department, and NPower. Responses were received from 238 non-profits with offices in Seattle.[6]
- **Technology Usage by Community and Neighborhood Groups**: A mail and e-mail survey was distributed to a list of about 300 community and neighborhood groups, based on a list maintained by the Department of Neighborhoods. Responses were received from 91 neighborhood groups.[7]
- **Community Technology Center Services**: Surveys and analysis were conducted to ascertain distribution, services and capacity use.
- **Small Businesses**: A survey of small businesses is currently being conducted in conjunction with Community Capital Development, a business assistance and lending organization. The results of this survey will be published separately when completed.

We need to expand access, we need to expand our vision, and we also need to know how we're doing. Unless we have some knowledge of what we want to accomplish with technology in our community, we are not going to know whether we're being successful and where the gaps are we need to focus on.
—Richard Conlin, Seattle City Council Member

Shifting Ground

These first set of measurements are starting signposts. Over time we will and must be able to refine the methodology and selection of data used.

Already over the three year course of this indicators project, our world has changed greatly. On top of world political events and economic fluctuations, use of the Internet and home ownership of computers continues to grow at some rate. The technologies also have changed. Cell phones and personal computing devices, such as Visors, Palm Pilots or Windows CE devices, are now commonplace in many communities. When we began, the information technology industry was growing at breakneck speed. The economy has slowed, and Seattle, like the rest of the country, has seen a decrease in new businesses and new jobs. Some of that slowdown is reflected in this research, and some is not. Over time, we will better be able to understand what realistic growth is and what is not.

Conversations have also progressed. As use of email and the web have grown, people are talking more about balancing the desire for information with the challenge of info overload. Attention is starting to focus more on quality of content and how to organize it. Tougher questions are being asked about cost versus benefit and how technology is really changing people's lives. Despite the lure of using technology, it is our ability to decide how to apply the tools appropriately and when not to use them that will make the difference in achieving other social and economic goals.

A vision of a technology healthy community created by the community is an important step and the data presented here tells us whether we're stepping in the right direction. It is the action taken after reading the data that will determine where we end up.

Notes

1 For the purpose of these indicators, information technology is defined as information and communication tools, including personal computers, computer applications software, Internet and web-based communications, and devices for the storage and retrieval of information.
2 Jeanne Gage and Don Harker, Mountain Association for Community Economic Development, www.communitiesbychoice.org, 1997
3 The materials and result of the forum are available online at www.cityofseattle.net/tech/indicators/data_collection.htm
4 For a full list of Technical Advisory Group members, see www.cityofseattle.net/tech/indicators/advisors.htm.
5 The full methodology, survey instrument, and results of this survey can be found at www.cityofseattle.net/tech/indicators/data_collection.htm or through the Seattle Public Library.
6 The full methodology, survey instrument, and results of this survey can be found at www.cityofseattle.net/tech/indicators/data_collection.htm
7 The full methodology, survey instrument, and results of this survey can be found at www.cityofseattle.net/tech/indicators/data_collection.htm

Definitions: Icons and Indicators

Early in the IT impact indicators project we chose five important themes to help guide our discussions. We found that these themes, *access*, *literacy*, *content*, *diversity*, and *infrastructure*, wove through all areas of the indicators. In this final report we have tagged some of the items with icons representing these themes. We have not attempted to tag all the indicators; we hope the icons will help remind readers of these themes and illustrate the continuity of issues across our measurement categories.

Access

All residents need to have access to information technology (IT) tools and training in order to find employment, access information, and participate in civic and cultural life.

Literacy

All residents should receive the training needed to reach a basic technology literacy benchmark. Beyond that we should strive for information technology fluency, where residents become self-learners, teach others and are more able to apply their skills and contribute to the direction of IT development.

Content

Internet delivered content should reflect the diversity of our population, offering information that is important to all residents. We also need to encourage responsibility for content and the ability for families to make choices about their use of the Internet.

Diversity

The design and availability of technology tools should support the interests and serve the needs of our diverse community. We should strive to train a diverse IT workforce.

Infrastructure

Sufficient infrastructure needs to be provided to enable all areas of our community (geographic and organizational) to participate fully in the information age.

What is an Indicator?

An indicator is a measure that summarizes information about a particular subject and may point to particular problems. It provides a reasonable response to specific needs and questions asked by decision and policy makers. Indicators show trends, provide quantitative and qualitative information, but they can be more than pieces of information if designed in response to well defined policy objectives. Policy-oriented indicators help prioritise and define targets.

Source: United Nations Centre for Human Settlements—UNCHS (Habitat), Global Urban Observatory—Urban Indicators Programme, *http://www.unhabitat.org/guo/index.html*